

Answers and Explanations

Verbal Ability and Reading Comprehension (VARC)

1. Option (2) is correct.

The author's reasoning emphasises the importance of going beyond mere factual details in historical accounts. According to the passage, the author would likely focus on exploring the socio-political and economic factors that led to the Battle of Hastings, rather than just presenting a straightforward timeline or relying solely on established facts. The emphasis on the "pulpy part" of historical interpretation suggests a desire to delve into the complexities and nuances surrounding the events, utilising the auxiliary sciences and acknowledging the selective nature of historical storytelling. The "auxiliary sciences" of history, i.e., archaeology, epigraphy, numismatics, chronology reflect the socio-political and economic factors of the time that led to the battle. Therefore, option 2, which emphasises exploring the broader contextual factors, aligns with the author's approach to historical writing as outlined in the passage.

2. Option (2) is correct.

According to the passage, archaeology is considered one of the "auxiliary sciences" of history. While the common-sense view acknowledges the importance of basic facts like the date and location of historical events, the historian's primary duty is not just factual accuracy. Archaeology is highlighted as a tool that aids historians in ensuring the accuracy of these basic facts, such as verifying the locations and details associated with historical events, thereby supporting the historian's essential function.

3. Option (2) is correct.

If true, it does not weaken the passage's claim that facts do not speak for themselves. The passage argues that the historian plays a crucial role in selecting and arranging facts, and option 2, which suggests that facts can be relative, aligns with this perspective rather than weakening it. The other options (1, 3, and 4) would weaken the passage's claim by suggesting that facts do have some inherent objectivity or independence from interpretation.

4. Option (4) is correct.

The common-sense view, as discussed in the passage, aligns with options 1, 2, and 3. It emphasises the importance of historical facts and the positivist approach in ascertaining credible historical knowledge (option 1), the objectivity of history derived from facts (option 2), and the reliance on documents, inscriptions, and other sources (option 3). Option 4 introduces the idea of history being a "selective system of cognitive orientations to reality," which is more aligned with the passage's characterisation of history than being contrary to the common-sense view. This is evinced in 'Professor Talcott Parsons once called [science] "a selective system of cognitive orientations to reality." ... But history is, among other things, that.' Therefore, option 4 is the exception.

5. Option (4) is correct.

Based on the information in the passage, option 4, "A murder mystery drama set in North Africa and France," would likely be the most successful with audiences across the EU. The passage suggests that genres like whodunits and conflicts between different groups have a more universal appeal. Additionally, the success of the French crime caper "Lupin" on Netflix is mentioned, indicating an interest in crime-related content. Thus, none of the science fiction, comedy or romantic series will work.

6. Option (4) is correct.

The passage suggests that the availability of Netflix and similar platforms across Europe contributes to cultural integration and shared entertainment experiences, making culture a cross-border endeavour and potentially fostering a sense of commonality among Europeans. Option (1) is explicitly mentioned in the 3rd paragraph. Option (3) is corroborated in 'In 2015, about 75% of Netflix's original content was American; now the figure is half'. Since the economics of European productions are more appealing, as substantiated through the success of "Lupin", a French crime caper on Netflix.

7. Option (2) is correct.

The passage mentions that Netflix has offices across Europe and has about 100 productions

underway in Europe, but it also notes that the big decisions still rest with American executives. Therefore, while Netflix has expanded its presence in Europe, it may not be considered a fully European entity in terms of decision-making and cultural integration.

8. **Option (1) is correct.**

This finding suggests that there is not a uniform or shared preference for Netflix content across all European countries, which could undermine the idea of Netflix serving as a unifying force in terms of shared cultural experiences.

9. **Option (4) is correct.**

The author is likely to agree with the statement that "liberalism was the dominant ideal in the past century, but it had to reform itself to remain so." The passage acknowledges that liberalism has faced challenges in the past, and it highlights that liberalism has demonstrated an ability to reform itself in response to internal problems. The author's main argument is against the notion that liberalism is irreparably disintegrating, emphasising that it has the capacity for self-reform. Therefore, option 4 aligns with the author's perspective. This verifies the author's argument in option (3). The writer opposes the perception 'the only way for people to liberate themselves from the contradictions of liberalism is "liberation from liberalism itself"'; refuting the rationale of option (1). Option (2) is corroborated in the statement 'the essence of liberalism lies in freeing individuals from constraints.'

10. **Option (1) is correct.**

This statement does not provide evidence of the decline of liberalism; rather, it mentions issues that were present in the late 19th century. The passage mentions that during that historical period, America faced problems such as the creation of a business aristocracy and the rise of vast companies. However, the passage argues that liberalism was able to reform itself in response to these challenges. Therefore, this statement is not evidence of the decline of liberalism today as the other options are.

11. **Option (3) is correct.**

The passage suggests that the author sees the Davos elite as emblematic of the gap between liberalism's claims and the lived reality, highlighting the disconnect between professed liberal values and the concentration of wealth among the elite, as connoted through the phrase 'old-fashioned greed'.

12. **Option (2) is correct.**

The author faults Deneen's conclusions for his narrow definition of liberalism limited to individual freedoms. The passage mentions that Mr. Deneen's fixation on the essence of

liberalism, particularly its focus on freeing individuals from constraints, is a problem. The author argues that liberalism contains a wide range of intellectual traditions that provide different answers to the balance between individual rights and social responsibilities. Therefore, the passage criticises Deneen's narrow characterisation of liberalism rather than his repeated harking back to premodern notions of liberty.

13. **Option (3) is correct.**

The passage suggests that to combat the environmental impact of fast fashion, consumers are encouraged to buy high-quality items that shed less and last longer. This aligns with the concept of 'slow fashion,' which emphasises durable and sustainable clothing choices.

14. **Option (1) is correct.**

The passage does not explicitly mention that the British don't buy second-hand clothing. Instead, it emphasises that luxury brands prefer not to circulate their latest season stock globally to be sold at a cheaper price, and there is a generation that has been taught that only buying new products is the norm. The reasons mentioned are more about luxury brand strategies and consumer perceptions, not necessarily the unwillingness of British consumers to buy second-hand clothing.

15. **Option (2) is correct.**

The passage mentions that while thrifting or purchasing second-hand clothing is considered a solution to the environmental problems caused by fast fashion, it also introduces its own set of issues, such as the shedding of microfibers and contributing to microfiber pollution when older clothes are laundered. This introduces an element of irony to the act of thrifting.

16. **Option (2) is correct.**

The central idea of the passage revolves around the environmental impact of fast fashion, the benefits of second-hand shopping, and the potential issues even with second-hand clothes. If second-hand stores sold only high-quality clothes, it would undermine the argument about the environmental impact of microfibers from older clothes and the need for consumers to be mindful of the quality of second-hand items they purchase.

17. **Option (2) is correct.**

The sentence "And probably much earlier, moving the documentation for kissing back 1,000 years compared to what was acknowledged in the scientific community" would best fit in Option 2. This is because the sentence before this talks about kissing being a well-established practice 4,500 years ago in

the Middle East. The additional sentence fits seamlessly after this point, providing further information about the timeline of kissing practices and emphasising that evidence suggests the documentation for kissing may go back even earlier than previously acknowledged in the scientific community, extending the history of kissing by 1,000 years.

18. Option (2) is correct.

The sentence "Dualism was long held as the defining feature of developing countries in contrast to developed countries, where frontier technologies and high productivity were assumed to prevail" would best fit in Option 2. This is because sentence before this introduces the concept of 'productive dualism' as the core idea of development economics, describing the split between a 'modern' and a 'traditional' sector in poor countries' economies. The additional sentence aligns with Option 2 by providing historical context and contrasting the long-held notion of dualism in developing countries with the assumption about developed countries' technological and productivity superiority. This strain of thought continues in the next sentence – 'this distinction between developing and advanced economies', making it the correct option.

19. Correct answer is [3].

The odd sentence is 3. While sentences 2, 4, 5, and 1 together form a coherent paragraph discussing the concept of "Latchkey children," the challenges they face, and the replacement of the term with "children in self-care," sentence 3 disrupts the flow. It introduces an unexpected element about the general negative outcomes of self-care, which doesn't align smoothly with the overall context. The correct sequence is 2-4-5-1, where the sentences logically connect to provide a comprehensive understanding of the topic.

20. Correct answer is [2].

The odd sentence is 2. While sentences 4, 1, 3, and 5 form a coherent paragraph discussing the banning and challenging of books in the US, the importance of the novel *Northern Lights*, and the rising number of reported challenges, sentence 2 disrupts the flow by introducing a general statement about attempts to ban books. The correct sequence is 4-1-3-5, where the sentences logically connect to provide a comprehensive overview of the topic, specifically focusing on the banning of *Northern Lights* and the broader trend of book challenges in the US.

21. Correct answer is [4132].

The correct sequence is 4-1-3-2. Sentence 4 introduces the topic of human consciousness

as an emergent property of the brain. Sentence 1 uses an analogy with ants to emphasise that complex information like self-awareness is not held by a single neuron. Sentence 3 elaborates on this idea, highlighting that complex emotions like fear and joy arise from the collective activity of all neurons. Finally, sentence 2 discusses the consensus among neurobiologists that the mechanism of emergence involves complex interconnections among brain parts. This sequence creates a logical progression, introducing the concept, elaborating on it, and then discussing the current understanding among neurobiologists.

22. Correct answer is [4321].

The correct sequence is 4-3-2-1. Sentence 4 introduces the conflict between Western Christian concepts and indigenous African tradition. Sentence 3 challenges the views presented in sentence 4, asserting that a rich African cultural ethos exists despite the denial from Western perspectives. Sentence 2 attributes condescension to the Western tradition, providing context to the conflict. Finally, sentence 1 mentions the contemporary African work 'The Bottled Leopard' as an example illustrating this theme of cultural conflict through the juxtaposition of two children and backgrounds. This sequencing creates a logical flow, progressing from the conflict to the assertion of the richness of African culture and its representation in literature.

23. Option (3) is correct.

This captures the key points that heatwaves are becoming more severe due to climate change, certain populations are more vulnerable, and the media can play a crucial role in warning people about the dangers of extreme heat. Option (1) is inadequate by not focusing on the role of media to warn about the potential effects of heatwaves. Option (2) is more of an opinion and confined to news stories, which is irrelevant. Option (4) focuses more on the inadequacy of the reports, rather than concentrating on the role of media to warn about the potential effects of heatwaves.

24. Option (1) is correct.

This captures the main points that people create counterfactual alternatives for various reasons, and this ability develops throughout childhood, contributing to reasoning about other people's beliefs. It encompasses the multifaceted nature of counterfactual thinking and its developmental significance. Option (2) is a close call but it eliminates the developmental significance and continues to state the reasons. In fact, options (3) and (4) highlight the reason for creating counterfactual alternatives. Thus, all of them, except (1) are limited in scope.

Data Interpretation and Logical Reasoning (DILR)

Solution for Questions 1 to 5:

The following table can be drawn using the direct given information:

Firm	Term of Existence	Amount Raised (₹ Crores)	Split of Amount Every Year								
			2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21	1							1	
Bzygoo	2012–2015					1			1		
Czechy	2013	9									
Drjbna	2011–2015	10			1				1		
Elavalaki	2010	13									

For Bzygoo,

Only 2 years of funding are left; 2013 and 2014.

Possible pair of funding for Bzygoo: 1, 2, 3, 1 and 1, 3, 2, 1.

In both the possible cases Bzygoo got funding of 7 crores.

Firm	Term of Existence	Amount Raised (₹ Crores)		Split of Amount Every Year								
				2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21		1							1	
Bzygoo	2012–2015	7	Case: 1				1	2	3	1		
			Case: 2				1	3	2	1		
Czechy	2013	9										
Drjbna	2011–2015	10				1				1		
Elavalaki	2010	13										

For Czechy,

The total funding is 9 out of which 2 crores has been raised in 1st and last year.

So, possibility for Czechy within the given conditions is 1, 2, 3, 2 only because if we decrease or increase his number of years than the split is not possible which satisfies the given conditions.

Since it's the only case, we can deduce that the company of Czechy existed till 2017.

Firm	Term of Existence	Amount Raised (₹ Crores)		Split of Amount Every Year								
				2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21		1							1	
Bzygoo	2012–2015	7	Case: 1				1	2	3	1		
			Case: 2				1	3	2	1		
Czechy	2013–2017	9						1	2	3	2	1
Drjbna	2011–2015	10				1				1		
Elavalaki	2010	13										

For Drjbna,

The funding is of 10 of which 2 in the first and last year. Now, we left with only 3 years in between and the remaining 8 must be distributed as per the given conditions.

This can only happen with the distribution of only 1, 2, 4, 2, 1.

Firm	Term of Existence	Amount Raised (₹ Crores)		Split of Amount Every Year								
				2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21		1							1	
Bzygoo	2012–2015	7	Case: 1				1	2	3	1		
			Case: 2				1	3	2	1		
Czechy	2013–2017	9						1	2	3	2	1
Drjbna	2011–2015	10				1	2	4	2	1		
Elavalaki	2010	13										

For Alfloo,

The years of existence are 8 and the funding is of 21 crores. Out of this 21-crore funding 2 crores have been raised in 1st and last year of existence. So, the remaining 19 crores to be distributed among 6 years in between withing the given conditions.

The possibility of distribution of funding are;

Case I: 1, 2, 3, 4, 5, 3, 2, 1

Case II: 1, 2, 3, 5, 4, 3, 2, 1

Firm	Term of Existence	Amount Raised (₹ Crores)		Split of Amount Every Year								
				2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21	Case: 1	1	2	3	4	5	3	2	1	
			Case: 2	1	2	3	5	4	3	2	1	
Bzygoo	2012–2015	7	Case: 1				1	2	3	1		
			Case: 2				1	3	2	1		
Czechy	2013–2017	9						1	2	3	2	1
Drjbna	2011–2015	10				1	2	4	2	1		
Elavalaki	2010	13										

For Elavalaki,

The funding is of 13 crores, which can be distributed only when the years of existence are either 5 or 6.

When the number of years is 5, in this scenario Elavalaki must have worked till 2014.

The distribution of funding can be done only in a way which is 1, 3, 5, 3, 1.

When the number of years is 6, in this scenario Elavalaki must have worked till 2015.

The distribution of 13 in 6 years can be done by 2 ways;

Case I: 1, 2, 3, 4, 2, 1.

Case II: 1, 2, 4, 3, 2, 1

After filling all 3 cases of Elavalaki the final table will look like as follows;

Firm	Term of Existence	Amount Raised (₹ Crores)		Split of Amount Every Year								
				2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21	Case: 1	1	2	3	4	5	3	2	1	
			Case: 2	1	2	3	5	4	3	2	1	
Bzygoo	2012–2015	7	Case: 1				1	2	3	1		
			Case: 2				1	3	2	1		
Czechy	2013–2017	9						1	2	3	2	1
Drjbna	2011–2015	10				1	2	4	2	1		
Elavalaki	2010–2014	13	Case 1		1	3	5	3	1			
	2010–2015		Case 2		1	2	3	4	2	1		
	2010–2015		Case 3		1	2	4	3	2	1		

1. Option (4) is correct.

From the final table, except Czechy and Drjbna, all have multiple possibilities. Hence, we can be certain about only Czechy and Drjbna.

2. Option (2) is correct.

Except Elavalaki, we are definite about the amount raised by each person.

Amount raised by people except Elavalaki = $2 + 1 + 3 + 1 = 7$ crores

For Elavalaki, there are 2 possibilities of amount raised in 2015,

It is either 1 or 0.

Hence, total amount raised can be either 7 crores (when Elavalaki worked till 2014) or 8 crores (when Elavalaki worked till 2015).

3. Correct answer is [17].

For the maximisation of amount in 2013, we have to pick the cases in which person has raised highest amount.

Amount = Alfloo's Amount in Case 1 + Bzygoo's Amount in Case 2 + Czechy's Amount + Drjbna's Amount + Elavalaki's Amount in Case 2

= $5 + 3 + 1 + 4 + 4$

= 17 crores

Out of the given values of Bzygoo and Elavalaki, the only pair possible is when Bzygoo and Elavalaki got 3 crores and 2 crores, respectively.

Bzygoo got 3 crores in Case 1 and Elavalaki got 3 crores in both Case 2 and Case 3.

Firm	Term of Existence	Amount Raised (₹ Crores)		Split of Amount Every Year								
				2009	2010	2011	2012	2013	2014	2015	2016	2017
Alfloo	2009–2016	21	Case: 1	1	2	3	4	5	3	2	1	
			Case: 2	1	2	3	5	4	3	2	1	
Bzygoo	2012–2015	7	Case: 1				1	2	3	1		
			Case: 2				1	3	2	1		
Czechy	2013–2017	9						1	2	3	2	1
Drjbna	2011–2015	10				1	2	4	2	1		
Elavalaki	2010–2014	13	Case 1		1	3	5	3	1			
	2010–2015		Case 2		1	2	3	4	2	1		
	2010–2015		Case 3		1	2	4	3	2	1		

Now, let's check the given options one by one;

Option 1

Alfloo raised 4 or 5 crores in 2013 and Drjbna raised 4. Alfloo raised the same amount of money as Drjbna in 2013. (Partially True)

Option 2

Bzygoo raised 3 crores in 2014 and Elavalaki raised 2 crores.

Bzygoo raised more money than Elavalaki in 2014. (True)

4. Correct answer is [4].

For the smallest amount, we have to pick case in which person has raised smallest amount.

Given: Elavalaki has raised 3 crores in 2013.

The given condition is possible only in Case 1 and Case 3. It means for Elavalaki, we have to choose a smaller value in 2012 out of Case 1 and Case 3.

The amount of funding Elavalaki received in 2012 as per the given condition is in Case 3.

Total of minimum amount received = Alfloo's Amount in Case 1 + Bzygoo's Amount in either of the case + Drjbna's Amount + Elavalaki's Amount in Case 3.

= $4 + 1 + 2 + 4$

= 11 crores

5. Option (3) is correct.

The possible amount in 2014 is.

Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki
3	3/2	2	2	1/2

Amounts of Alfloo, Czechy and Drjbna are definite and adds up to 7. For having the amount of 12 crores we need 5 crores as sum from both Bzygoo and Elavalaki.

Option 3

Bzygoo raised 2 crores and Elavalaki raised 4 or 3 in 2013.

Bzygoo raised the same amount of money as Elavalaki in 2013. (Definitely False)

Option 4

Alfloo and Bzygoo both have raised 3 crores in 2014.

Alfloo raised the same amount of money as Bzygoo in 2014. (True)

Solution for Questions 6 to 10:

Given: last ride of Ride-3 must be completed by 1 p.m. and each ride lasts 1 hour.

It means that the last person who can take this ride-3 is at 12:00.

So, we can eliminate the ride time for Ride -3 after 12 and it can be filled in the table as follows;

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30				
9:30	10:00				
10:00	10:30				
10:30	11:00				
11:00	11:30				
11:30	12:00				
12:00	12:30				
12:30	1:00				
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00			X	

Given: Every ride is of 1 hour.

It means no ride can be taken at 4:30 because if a ride starts at 4:30 then it will exceed the time slot of 5:00.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30				
9:30	10:00				
10:00	10:30				
10:30	11:00				
11:00	11:30				
11:30	12:00				
12:00	12:30				
12:30	1:00				
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Given: Anjali took Ride-1 at 11 am after waiting for 30 mins for Chitra to complete it.

It means that Anjali was there from 11 am to 12 pm and Chitra entered to the ride at 10 am.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30				
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				
11:00	11:30	Anjali			
11:30	12:00				
12:00	12:30				
12:30	1:00				
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Given: Chitra never waited in the queue and completed her visit by 11 a.m. after spending ₹ 50 to pay for the ticket(s).

Chitra ended visit by 11 a.m. which means Ride 1 was her last ride which costed her ₹ 20. Since, she has spent ₹ 50 on ticket which tells us that Chitra has done one ride earlier than ride 1 which has costed her ₹ 30. The only possible case is when Chitra was in ride of Ride 3 from 9 a.m. to 10 a.m.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				
11:00	11:30	Anjali			
11:30	12:00				
12:00	12:30				
12:30	1:00				
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Chitra is out of the system by 12: 15 and it is given that all three visitors incurred the same amount of ticket expense by 12:15 p.m.

It means that Anjali and Bipasha would have also spent ₹ 50 each.

We know that Anjali had already spent ₹ 20 by 12 noon. So, Anjali must spend another ₹ 30 which would be possible only in Ride-3.

Given: Until explicitly mentioned nobody takes the break.

From these data points, we can deduce that Anjali had Ride 3 from 12:00 to 1: 00.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				
11:00	11:30	Anjali			
11:30	12:00				
12:00	12:30			Anjali	
12:30	1:00				
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Given: Bipasha began her first of three rides at 11:30 a.m.

We also know that she has also spent ₹ 50 before 12: 15.

Both the above statements combined together hints us that Bipasha has taken only one ride before 12: 15 which started at 11: 30 and the same ride costed her ₹ 50.

This can be possible only when Bipasha takes Ride 2 at 11: 30.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				
11:00	11:30	Anjali			
11:30	12:00		Bipasha		
12:00	12:30			Anjali	
12:30	1:00				
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	

3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Given: The last ride taken by Anjali and Bipasha was the same, where Bipasha waited 30 min for Anjali to complete her ride.

The given case is not possible in Ride 3 because by the time Anjali comes out of Ride 3, the ride 3 stopped operating.

The case is also not possible with Ride 1 because Anjali had completed Ride 1 at 12 noon and Bipasha should have entered at 12 noon but that time Bipasha is already at ride 2.

Since, Anjali has not taken a break which means at 1 p.m. Anjali either taking Ride 2 or Ride 4.

If Anjali takes Ride 4 at 1 p.m. then as soon as Anjali comes out Bipasha have to take Ride 4 but before that Bipasha have to take Ride 1 as well. There must be gap of one-and-a-half-hour break between these two ride of Bipasha.

Bipasha can not do all those things if Anjali takes Ride at 1 p.m.

From here we can say with certainty that Bipasha would go from Ride 2 to Ride 1 immediately.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				
11:00	11:30	Anjali			
11:30	12:00		Bipasha		
12:00	12:30			Anjali	
12:30	1:00	Bipasha			
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Now, after Ride 1, Bipasha will take 1 hour coffee break and will wait for 30 min. to start her next ride.

It means that Bipasha must have started her next ride (Ride 4) at 3 p.m.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				

11:00	11:30	Anjali			
11:30	12:00				
12:00	12:30		Bipasha	Anjali	
12:30	1:00				
1:00	1:30	Bipasha		X	
1:30	2:00			X	
2:00	2:30			X	
2:30	3:00			X	
3:00	3:30			X	Bipasha
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

Since, Bipasha had entered after Anjali which means Anjali had entered the ride 4 at 2 p.m.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				
11:00	11:30	Anjali			
11:30	12:00		Bipasha		
12:00	12:30			Anjali	
12:30	1:00	Bipasha			
1:00	1:30			X	
1:30	2:00			X	
2:00	2:30			X	Anjali
2:30	3:00			X	
3:00	3:30			X	Bipasha
3:30	4:00			X	
4:00	4:30			X	
4:30	5: 00	X	X	X	X

It is also known that Anjali had taken a ride between Ride 3 and Ride 4 which can only be Ride 2 between 1 p.m. to 2 p.m.

So, the final table will look like as follows.

START	End	Ride 1	Ride 2	Ride 3	Ride 4
		₹ 20	₹ 50	₹ 30	₹ 40
9:00	9:30			Chitra	
9:30	10:00				
10:00	10:30	Chitra			
10:30	11:00				

11:00	11:30	Anjali			
11:30	12:00		Bipasha		
12:00	12:30			Anjali	
12:30	1:00	Bipasha			
1:00	1:30		Anjali	X	
1:30	2:00			X	
2:00	2:30			X	Anjali
2:30	3:00			X	
3:00	3:30			X	Bipasha
3:30	4:00			X	
4:00	4:30			X	
4:30	5:00	X	X	X	X

6. **Option (1) is correct.**

Amount spent by Bipasha on tickets = Amount spent on one ride of Ride 1 + Amount spent on one ride of Ride 2 + Amount spent on one ride of Ride 4

$$= ₹ 20 + ₹ 50 + ₹ 40 = ₹ 110$$

7. **Option (4) is correct.**

From the final table,

Rides taken by Anjali before 2 p.m. = Ride 1, Ride 2 and Ride 3.

8. **Option (1) is correct.**

From the final table,

Ride taken by all the visitors is only Ride 1.

9. **Correct answer is [6].**

Total ride taken by Anjali = 4

Total ride taken by Bipasha = 2

So, total ride taken by both of them,

$$= 4 + 2 = 6$$

10. **Correct answer is [140].**

Amount spent by Anjali on tickets = Amount spent on one ride of Ride 1 + Amount spent on one ride of Ride 2 + Amount spent on one ride of Ride 3 + Amount spent on one ride of Ride 4

$$= ₹ 20 + ₹ 50 + ₹ 30 + ₹ 40$$

$$= ₹ 140$$

Solution for Questions 11 to 15:

Given: The 2-day average on a day, except on Day 1, is the average of the total scores of that day and of the previous day.

Now, converting the given averages into sum,

Day 1 + Day 2	30
Day 2 + Day 3	31
Day 3 + Day 4	32
Day 4 + Day 5	34

Let the total score on Day 1 was x .

Then, the total score on,

$$\text{Day 2} = 30 - x$$

$$\text{Day 3} = 31 - (30 - x) = 1 + x$$

$$\text{Day 4} = 32 - (1 + x) = 31 - x$$

$$\text{Day 5} = 34 - (31 - x) = 3 + x$$

Given: The total score on Day 3 is the same as the total score on Day 4.

From here,

$$1 + x = 31 - x$$

$$2x = 30$$

$$x = 15$$

Now, the scores on,

$$\text{Day 1} = 15$$

$$\text{Day 2} = 15$$

$$\text{Day 3} = 16$$

$$\text{Day 4} = 16$$

$$\text{Day 5} = 18$$

Now, a table can be formed using this,

	Day 1	Day 2	Day 3	Day 4	Day 5
Akhil					
Bimal					
Chatur					
Total	15	15	16	16	18

Given: Chatur always scores in multiples of 3.

Possible score of Chatur = 3, 6 and 9

Rankings on Day 3 for Akhil, Bimal and Chatur are 2, 2, 1. It means Akhil and Bimal had equal scores in Day 3.

Case I: Chatur scores 3 on day 3,

Then the score of Akhil and Bimal together is 13 which can't be divided equally.

Case II: Chatur scores 6 on day 3,

Then the score of Akhil and Bimal together is 10 which means both have score 5 each.

Case III: Chatur scores 9 on day 3,

Then the score of Akhil and Bimal together will be 7 which can't be divided equally.

Only Case II is satisfying the given conditions.

	Day 1	Day 2	Day 3	Day 4	Day 5
Akhil			5		
Bimal			5		
Chatur			6		
Total	15	15	16	16	18

Given: Chatur's score on Day 2 is the unique highest score in the competition. His minimum score is observed only on Day 1, and it matches Akhil's score on Day 4.

Since, Chatur has scored 6 on Day 3 and he scored highest on Day 2, the only possible score of Chatur on Day 2 is 9.

This score is unique and highest which means that no one will get 9.

Since, Chatur has scored 6 on Day 3 and he scored minimum score only on Day 1, the only possible score of Chatur on Day 1 is 3. It also means that now the Chatur will not score 3 on any of the remaining days. The only score that Chatur could have achieved is 6.

The deduced information can be filled in the table as;

	Day 1	Day 2	Day 3	Day 4	Day 5
Akhil			5	3	
Bimal			5		
Chatur	3	9	6	6	6
Total	15	15	16	16	18

In Day 4,

$$\text{Bimal's score} = 16 - (6 + 3) = 7$$

	Day 1	Day 2	Day 3	Day 4	Day 5
Akhil			5	3	
Bimal			5	7	
Chatur	3	9	6	6	6
Total	15	15	16	16	18

Given: Bimal's scores are the same on Day 1 and Day 3.

$$\text{Bimal's score on Day 1} = 3$$

Then,

$$\text{Akhil's score on Day 1} = 15 - (5 + 3) = 7$$

	Day 1	Day 2	Day 3	Day 4	Day 5
Akhil	7		5	3	
Bimal	5		5	7	
Chatur	3	9	6	6	6
Total	15	15	16	16	18

Ranks of Akhil and Bimal on Day 2 are 2 and 3, respectively, which means score of Akhil > score of Bimal.
Sum of their scores = $15 - 9 = 6$

In the given condition the possible scores of Akhil and Bimal are either 4, 2 or 5, 1, respectively.

	Day 1	Day 2		Day 3	Day 4	Day 5
		Possibility 1	Possibility 2			
Akhil	7	4	5	5	3	
Bimal	5	2	1	5	7	
Chatur	3	9	9	6	6	6
Total	15	15	15	16	16	18

Ranks of Akhil and Bimal and Chatur on Day 5 are 3, 1 and 2 which means that Akhil has scored less than 6 and Bimal has scored more than 6.

Sum of the scores of Akhil and Bimal = $18 - 6 = 12$

In the light of above conditions,

The scores of Bimal and Akhil are either 7, 5 or 8, 4. (Bimal can't take 9 because it has already taken by Chatur on Day 2 and it's a unique number).

So, the final table will be as follows.

	Day 1	Day 2		Day 3	Day 4	Day 5	
		Possibility 1	Possibility 2			Possibility 1	Possibility 2
Akhil	7	4	5	5	3	5	4
Bimal	5	2	1	5	7	7	8
Chatur	3	9	9	6	6	6	6
Total	15	15	15	16	16	18	18

11. Option (1) is correct.

From the final table,
Score of Akhil on Day 1 will be 7.

12. Option (2) is correct.

Total score of Akhil
 $= 7 + 4/5 + 5 + 3 + 5/4$
 Possible sum = 24, 25, 23
 Total score of Bimal
 $= 5 + 2/1 + 5 + 7 + 7/8$
 Possible sum = 26, 27, 25
 Total score of Chatur
 $3 + 9 + 6 + 6 + 6 = 30$
 In every scenario Chatur has scored highest.

13. Correct answer is (25).

Total score of Bimal
 $= 5 + 2/1 + 5 + 7 + 7/8$
 Possible sum = 26, 27, 25
 Minimum Possible sum = 25

14. Option (4) is correct.

There will be 4 cases of Bimal's total score.

Case I: When we are taking Bimal's score in Possibility 1 of Day 2 with his score on Possibility 1 of Day 5.

Then the total score of Bimal = $5 + 2 + 5 + 7 + 7 = 26$

Case II: When we are taking Bimal's score in Possibility 1 of Day 2 with his score on Possibility 2 of Day 5.

Then the total score of Bimal = $5 + 2 + 5 + 7 + 8 = 27$

Case III: When we are taking Bimal's score in Possibility 2 of Day 2 with his score on Possibility 1 of Day 5.

Then the total score of Bimal = $5 + 1 + 5 + 7 + 7 = 26$

Case IV: When we are taking Bimal's score in Possibility 2 of Day 2 with his score on Possibility 2 of Day 5.

Then the total score of Bimal = $5 + 1 + 5 + 7 + 8 = 26$

Sum of score in multiple of 3 is only in Case II. Hence considering this case as true, score of Akhil on Day 2 will be 4.

15. Correct answer is [26].

	Day 1	Day 2		Day 3	Day 4	Day 5	
		Possibility 1	Possibility 2			Possibility 1	Possibility 2
Akhil	7	4	5	5	3	5	4
Bimal	5	2	1	5	7	7	8
Chatur	3	9	9	6	6	6	6
Total	15	15	15	16	16	18	18

Sum of Akhil's score on Day 1, Day 3 and Day 4 = $7 + 5 + 3 = 15$

To attain a score of 24 the required sum of the score in Day 2 and Day 5 = $24 - 15 = 9$

Out of possible number of Day 2 and Day 5, possible numbers, which give us the sum of 9 are 5, 4 and 4, 5.

Case I: When we are taking Bimal's score in Possibility 1 of Day 2 with his score on Possibility 1 of Day 5.

Then the total score of Bimal = $5 + 2 + 5 + 7 + 7 = 26$

Case II: When we are taking Bimal's score in Possibility 2 of Day 2 with his score on Possibility 2 of Day 5.

Then the total score of Bimal = $5 + 1 + 5 + 7 + 8 = 26$

Sum of score in multiple of 3 is only in Case II. In both scenarios the sum of Bimal's score is 26.

Solution for Questions 16 to 20:

Given: Each sack has a certain number of coins, between 1 and 9, both inclusive.

Possible number of coins in a Box = 1, 2, 3, 4, 5, 6, 7, 8, 9

Given: The average number of coins per sack in the boxes are all distinct integers.

Possible average of coins in a sack = 1, 2, 3, 4, 5, 6, 7, 8, 9

Total number of coins in a sack = $3(1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9) = 135$

Given: The total number of coins in each row is the same. The total number of coins in each column is also the same.

Number of coins per row = Number of coins per column = $135/3 = 45$

Median = Middle number after arranging the numbers in ascending or descending order and median will only be one of the numbers out of all the numbers.

The median of each box can be written in the middle of each box.

	1 st Column			2 nd Column			3 rd Column		
1 st Row					9			6	
2 nd Row		2							
3 rd Row		8							

Now, let's discuss each box one by one.

For box of 2nd Row and 1st Column,

It is given in Table 1 that the median of this box is 2.

Since, there are 3 numbers in the box. So, one of the numbers out of 3 will be greater than 3 and another would be smaller than 3.

For the same box in Table 2, there are 1** which means 1 of the three numbers in the box is greater than 5. 2 Stars (**) in this means it satisfies 2 conditions out of the given of 3 conditions/statements.

Now, let's come to statement number 2,

It says the median of this box will be 1, which is false because we have already got median as 2.

So, the remaining 2 conditions will be definitely following because there are 2 stars.

As per Statement 1,

Minimum number of coins is 1.

As per Statement 3,

Maximum number of coins is 9.

It means the other number in the mentioned box are 1 and 9.

The sum of the number of coins in the box = $1 + 2 + 9 = 12$

	1 st Column			2 nd Column			3 rd Column		
1 st Row					9			6	
2 nd Row	1	2	9						
3 rd Row		8							

For box of 3rd Row and 1st Column,

It is given in Table 1 that the median of this box is 8.

Since, there are 3 numbers in the box. So, one of the numbers out of 3 will be greater than 8 and another would be smaller than 8.

For the same box in Table 2, there is 3* which means all the three numbers in the box is greater than 5. 1 Stars (*) in this means it satisfies 1 condition out of the given of 3 conditions/statements.

Now, let's come to Statement 1,

It says that the minimum number of coins in the box is 1 which is false because we already established that all the numbers would be greater than 5.

Statement 2,

It says the median of this box will be 1, which is false because we have already got median as 8.

So, the remaining 1 condition will be definitely following because there is 1 star.

As per Statement 3,

Maximum number of coins is 9.

Another number lesser than 8 and which gives sum as multiple of 3 will only be 7.

It means the other number in the mentioned box are 7 and 9.

Total number of coins in the box = $7 + 8 + 9 = 24$

	1 st Column			2 nd Column			3 rd Column		
1 st Row					9			6	
2 nd Row	1	2	9						
3 rd Row	7	8	9						

For box of 1st Row and 1st Column,

Sum of the coins in every column is 45,

Then, the sum of the number of coins in 1st Row and 1st Column = $45 - (12 + 24) = 9$

For the same box in Table 2, there is 1** which means one of the three numbers in the box is greater than 5. 2 Stars (**) in this means it satisfies 2 conditions out of the given of 3 conditions/statements.

Now, let's come to Statement 3,

It says that the maximum number of coins in the box is 9 which is false because we need sum of the boxes as 9. It can't take one of the values as 9.

So, the remaining 2 condition will be definitely following because there are 2 stars.

As per Statement 1,

Minimum number of coins is 1.

As per the Statement 2,

Median of the number = 1

So, another number in the box is 1.

3rd number in the box = $9 - (1 + 1) = 7$

Hence, the number in this box are 1, 1 and 7.

The sum of the numbers in the box = 9

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7		9			6	
2 nd Row	1	2	9						
3 rd Row	7	8	9						

For box of 1st Row and 2nd Column,

In Table 1,

Median of the box is 9.

In Table 2,

2* is mentioned. It says 2 of the values in the box will be greater than 5 and out of the given statements only 1 condition will be satisfied.

We know the number of coins can only be from 1 to 9. To satisfy the condition of median of 9 another number must be 9.

It satisfies the Statement 3 but doesn't satisfy the Statement 2 because median can't be 1. Since, there is 1 star (*) mentioned which means only 1 statement will be followed.

The only statement out of three will be Statement 3.

So, the remaining number which would make sum multiple of 3 and lesser than 9 will only be 3.

The number of coins in the mentioned box is 3, 9, 9.

The sum of number of coins in the box = $3 + 9 + 9 = 21$

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7	3	9	9		6	
2 nd Row	1	2	9						
3 rd Row	7	8	9						

For box of 1st Row and 3rd Column,

The sum of numbers in each row = 45

The sum of number in box of 1st Row and 3rd Column = $45 - (9 + 21) = 15$

In Table 1,

Median of the number of coins in the box = 6

In Table 2,

2* is mentioned. It says 2 of the values in the box will be greater than 5 and out of the given statements only 1 conditions/statements will be satisfied.

As per Statement 3,

Maximum number is 9, which is not possible because it makes sum of 2 numbers 15 and nothing is left for 3rd number.

As per Statement 2,

Median is 1 which is not possible because Median is already mentioned as 6.

So, the only correct statement will be Statement 1.

As per Statement 1,

Minimum number is 1 than the 3rd number will be 8.

The number of coins in the mentioned box are 1, 6, 8.

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7	3	9	9	1	6	8
2 nd Row	1	2	9						
3 rd Row	7	8	9						

Remaining values of the sum of the number of coins in a box are: 3, 6, 18, 27.

For box of 3rd Row and 2nd Column,

In Table 2,

2** is mentioned. It says 2 of the values in the box will be greater than 5 and out of the given statements only 2 conditions/statements will be satisfied.

As per Statement 2,

Median of the number of coins is 1 which can't be correct because we already know that the 2 values in the box will be greater than 5.

So, we are left with 2 statements and both of them will be following because we need 2 to satisfy the conditions.

As per Statement 1,

Minimum number of coins in the box = 1

As per Statement 3,

Maximum number of coins in the Box = 9

Available options for making sum of the number of coins in the box are 3, 6, 18 and 27.

3 and 6 are directly eliminated because already have sum of 10. Sum of 27 we can't make because for that the number will exceed 9.

So, the only possible case for sum is 18.

To make sum of 18 the 3rd value in the box must be 8.

So, the number of coins in the mentioned box are 1, 8, 9.

The sum of number of coins in this box is 18.

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7	3	9	9	1	6	8
2 nd Row	1	2	9						
3 rd Row	7	8	9	1	8	9			

In Row 3,

The total number of coins in the box of 3rd Row and 3rd Column = $45 - (24 + 18) = 3$

For box of 3rd Row and 3rd Column,

In Table 2,

0** is mentioned. It says none of the three values in the box will be greater than 5 and out of the given statements only 2 conditions will be satisfied.

As per Statement 3,

One of the numbers must be 9 which can't be possible because no number in this box is greater than 5.

So, the remaining 2 statements will definitely be following.

As per Statement 1,

Minimum number of coins in the box = 1

As per Statement 2,

Median of the number of coins in the box = 1

Then, the 3rd number in the box = $3 - (1 + 1) = 1$

So, the number of coins in the box are 1, 1 and 1.

The sum of number of coins in this box is 3.

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7	3	9	9	1	6	8
2 nd Row	1	2	9						
3 rd Row	7	8	9	1	8	9	1	1	1

In Row 2,

The total number of coins in the box of 2nd Row and 2nd Column = $45 - (21 + 18) = 6$

For box of 2nd Row and 2nd Column,

In Table 2,

0* is mentioned which means that no number is greater than 5 and only one condition out of the three statements will be true.

As per Statement 3,

One of the numbers must be 9 which is not possible because the total sum of number of coins in the box is 6 only.

As per Statement 2,

The median of the number of coins is 1 which is also not possible because if we take median as 1 then the minimum number should also be 1 and in that case 2 of the statement will become correct.

So, the only Statement 1 will be correct.

As per Statement 1,

Minimum number of coins = 1

Now, we left with sum of 5 for the remaining two number which can only be done. It can only happen when one of the numbers is 2 and other is 3.

Total number of coins in the box = 4

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7	3	9	9	1	6	8
2 nd Row	1	2	9	1	2	3			
3 rd Row	7	8	9	1	8	9	1	1	1

For box of 2nd Row and 3rd Column,

The sum of the number of coins in this box = $45 - (15 + 3) = 27$

We know that the maximum number of coins can be 9.

So, only possible distribution of coins in this box is 9, 9 and 9.

Hence, the final table will be as follows.

	1 st Column			2 nd Column			3 rd Column		
1 st Row	1	1	7	3	9	9	1	6	8
2 nd Row	1	2	9	1	2	3	9	9	9
3 rd Row	7	8	9	1	8	9	1	1	1

16. Option (4) is correct.

Total number of coins in 3rd Row of all the columns = $7 + 8 + 9 + 1 + 8 + 9 + 1 + 1 + 1 = 45$

18. Correct answer is [4].

Mean and average of each box;

	1 st Column					2 nd Column					3 rd Column				
				Median	Average				Median	Average				Median	Average
1 st Row	1	1	7	1	3	3	9	9	9	7	1	6	8	6	5
2 nd Row	1	2	9	2	4	1	2	3	2	2	9	9	9	9	9
3 rd Row	7	8	9	8	8	1	8	9	8	6	1	1	1	1	1

From the above table,

The number of boxes having the same mean and average = 4

19. Correct answer is [9].

From the final table,

Number of sacks have exactly one coin = 9

17. Option (3) is correct.

From the final table,

Number of boxes have at least one sack containing 9 coins = 5

20. Correct answer is [5].

From the final table,

Number of boxes having all three sacks with different numbers of coins = 5

Quantitative Aptitude (QA)

1. Option (2) is correct.

k divides $m + 2n$ and $3m + 4n$ both.

$$\therefore m + 2n = \lambda_1 k \quad \dots(1)$$

$$\text{and } 3m + 4n = \lambda_2 k \quad \dots(2)$$

where λ_1 & λ_2 are natural numbers.

Solving (1) & (2),

$$m = (2\lambda_2 - \lambda_1)k \text{ and } 2n = (3\lambda_1 - \lambda_2)k$$

So, m and $2n$ are common divisor.

2. Option (4) is correct.

$$2^{4x^2} - 2^{2x^2 + x + 16} + 2^{2x + 30} = 0$$

$$\text{let } 2^{2x^2} = t_1 \text{ \& } 2^{x+15} = t_2$$

$$t_1^2 - 2t_1 t_2 + t_2^2 = 0$$

$$(t_1 - t_2)^2 = 0$$

$$t_1 = t_2$$

$$2^{2x^2} = 2^{x+15}$$

$$2x^2 = x + 15$$

$$2x^2 - x - 15 = 0$$

$$\Rightarrow (2x + 5)(x - 3) = 0$$

$$x = \frac{-5}{2} \text{ or } 3$$

$$\therefore \text{sum} = 3 - \frac{5}{2} = \frac{1}{2}$$

3. Option (4) is correct.

$$\begin{aligned}\frac{x}{y} &< \frac{x+3}{y-3} \\ \frac{x}{y} - \frac{x+3}{y-3} &< 0 \\ \frac{xy - 3x - xy - 3y}{y(y-3)} &< 0 \\ \frac{-3(x+y)}{y(y-3)} &< 0\end{aligned}$$

$$\therefore y < 0 \Rightarrow y(y-3) > 0$$

$$y-3 < 0$$

\therefore Eq. (1) can be

$$(x+y) > 0$$

$$\Rightarrow y > -x.$$

4. Option (1) is correct.

Given

$$a^m b^n = (144)^{145}$$

$$a^m b^n = (12^2)^{145}$$

$$a^m b^n = (12)^{290}$$

$$= (2^2 \times 3)^{290}$$

$$= 2^{580} \times 3^{290}$$

\therefore To maximum value of $n-m$,

$$\text{assume } a = 3^{290}$$

$$\therefore m = 1$$

$$\text{and } b = 2 \text{ \& } n = 580$$

$$\therefore n-m = 580-1 = 579$$

5. Correct answer is [6].

$$(x-1)^2 + 2kx + 11 = 0$$

$$x^2 + 2kx - 2x + 12 = 0$$

$$x^2 + 2(k-1)x + 12 = 0$$

For no real roots,

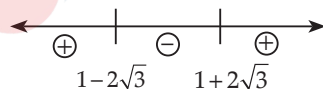
$$D < 0$$

$$b^2 - 4ac < 0$$

$$[2(k-1)]^2 - 4(1)(12) < 0$$

$$(k-1)^2 - (2\sqrt{3})^2 < 0$$

$$(k-1-2\sqrt{3})(k-1+2\sqrt{3}) < 0$$



$$\text{e.g., } (1-2\sqrt{3}, 1+2\sqrt{3})$$

Largest integer value of $k = 4$

$$P = \frac{k}{4y} + 9y$$

$$\therefore P = \frac{1}{y} + 9y$$

$$\text{AM} \geq \text{GM} \Rightarrow \frac{\frac{1}{y} + 9y}{2} \geq \sqrt{\frac{1}{y} \cdot 9y}$$

$$\Rightarrow P_{\min} = 6.$$

6. Correct answer is [15].

Positive integer less than 30 having exactly two distinct factor,

$$(\text{Prime no})_1 \times (\text{Prime no})_2$$

$$= 2 \times 3, 2 \times 5, 2 \times 7, 2 \times 11, 2 \times 13, 2 \times 17, 2 \times 19, 2 \times 23 \Rightarrow (8)$$

$$\Rightarrow 3 \times \{5, 7, 11, 13\} \Rightarrow (4)$$

$$\Rightarrow 5 \times \{7\} = (1)$$

$$\therefore \text{Total} = 13$$

...(1)

7. Correct answer is [7].

$$\log_{\sqrt{3}} x + \frac{\log x^{25}}{\log_x 0.008} = \frac{16}{3}$$

$$\log_{\sqrt{3}} x + \log_{\frac{8}{1000}} 25 = \frac{16}{3}$$

$$\log_{\sqrt{3}} x + \log_{5^{-3}} 5^2 = \frac{16}{3}$$

$$\log_{\sqrt{3}} x - \frac{2}{3} \log_5 5 = \frac{16}{3}$$

$$\log_{\sqrt{3}} x = \frac{16}{3} + \frac{2}{3}$$

$$\log_{\sqrt{3}} x = 6$$

$$x = (\sqrt{3})^6$$

$$\Rightarrow x^2 = 3^6$$

$$3x^2 = 3^7$$

$$\log_3 3x^2 = 7$$

8. Option (2) is correct.

Let time taken by A and C alone to fill the tank is x & y hours, respectively.

\therefore time taken by B alone = $(x-1)$ hours

Case-1: All of them can fill to tank in 2 hours.

$$\frac{1}{x} - \frac{1}{x-1} + \frac{1}{y} = \frac{1}{2} \quad \dots(1)$$

Case 2: B works for 1 hours and C works for $\frac{5}{4}$ hours.

$$\Rightarrow \frac{-1}{x-1} \times 1 + \frac{1}{y} \times \frac{9}{4} = 1 \quad \dots(2)$$

by (1) & (2),

$$\text{We get } x(x-1) = 18(x-1) - 10x$$

$$\Rightarrow x^2 - 9x + 18 = 0$$

$$\Rightarrow (x-3)(x-6) = 0$$

$$\Rightarrow x = 3 \text{ or } 6$$

$\therefore x$ should be less than 5.

$$\therefore x = 3$$

$$\therefore \text{by (1)} \quad \frac{1}{3} - \frac{1}{2} + \frac{1}{y} = \frac{1}{2} \Rightarrow y = \frac{3}{2} \text{ hours}$$

$$\therefore y = 90 \text{ min}$$

9. Option (4) is correct.

Let the amount paid at the end of 2nd year be ₹ x .

$$\therefore 2,00,000 \times \left(1 + \frac{8/2}{100}\right)^{2 \times 3} = 10,320 \times \left(1 + \frac{8/2}{100}\right)^{2 \times 2} + x.$$

$$\Rightarrow x = 2,40,991$$

$$\therefore \text{total interest paid} = 10,320 + 2,40,991 - 2,00,000 = 51,311$$

10. Option (3) is correct.

$$\text{Speed of Ravi} = 40 \times \frac{5}{18} = \frac{100}{9} \text{ m/s}$$

$$\text{Speed of Ashok} = 50 \times \frac{5}{18} = \frac{125}{9} \text{ m/s}$$

Time taken for them to meet

$$= \frac{225}{\frac{100}{9} + \frac{125}{9}} = \frac{225 \times 18}{450} = 9 \text{ s}$$

 \Rightarrow Vijay and Ravi should also meet in 9 s

$$\therefore 9 = \frac{54}{V - \frac{100}{9}}$$

$$\Rightarrow 9V - 100 = 54$$

$$\Rightarrow V = 154/9 \text{ m/s}$$

$$= \frac{154}{9} \times \frac{5}{18} \text{ km/h} = 61.6 \text{ km/h.}$$

11. Option (2) is correct.

Initial cost price of Minu = ₹ 1000

 \therefore Minu sells it to Kanu at 20% profit

$$\therefore \text{Selling price} = 1000 + 1000 \times \frac{20}{100} = 1200$$

 \therefore Profit earned = 200Now Kanu sells it back to Minu 20% loss on 1200 $\Rightarrow 1200 - 240 = 960$ ₹Now, let Minu sells it to Kanu at a profit of x .

$$\therefore 200 + x = 500$$

$$x = 300$$

$$\therefore \text{Percentage} = \frac{300}{960} \times 100 = 31.25\%$$

12. Option (2) is correct. \therefore Price \propto (weight)²Let $P \propto w^2$

$$\Rightarrow P = kw^2$$

Total value after breaking of the stone will be highest if one of the pieces is as heavy as possible and others are as light as possible.

 \Rightarrow The weights of the pieces are 1, 2, 3 and 12 units.

$$\therefore \text{Total value} = k \times 1^2 + k \times 2^2 + k \times 3^2 + k \times 12^2 = 158k$$

Now for least:

 \Rightarrow The weight of the pieces 3, 4, 5 & 6 units.

$$\therefore \text{Total value} = k \times 3^2 + k \times 4^2 + k \times 5^2 + k \times 6^2 = 86k$$

According to the question,

$$\therefore 158k - 86k = 288000$$

$$\Rightarrow 72k = 288000$$

$$\Rightarrow k = 400$$

$$\therefore \text{Weight of original stone} = 400 \times 18^2 = 1296000$$

13. Option (1) is correct.Let the total number of employees be 100 and their average salary be ' p '. \Rightarrow There are 20 manufacturing employees and 80 non-manufacturing.Let the average salary of manufacturing employees be ' x ' and non-manufacturing employees be ' y ' \Rightarrow According to question,

$$20x = \frac{1}{6} \times 100p$$

$$\Rightarrow x = \frac{5p}{6}$$

and total salary of non-manufacturing employees is five-sixth that of total employees.

$$\Rightarrow 80x = \frac{5}{6} \times 100 \times p$$

$$x = 25p/24$$

$$\therefore \text{Ratio} = \frac{5p}{6} : \frac{25p}{24} = 4 : 5$$

14. Correct answer is [7]. \therefore 4 litres out of 40 litres is removed hence,

$$\frac{4}{40} = \frac{1}{10^{\text{th}}} \text{ is remove \& every time.}$$

$$\therefore 1 - \frac{1}{10} = \frac{9}{10^{\text{th}}} \text{ remains every time.}$$

 \therefore Quantity of milk remaining after n

$$\text{replacements} = 40 \times \left(\frac{9}{10}\right)^n < 20$$

$$\Rightarrow (0.9)^n < 0.5$$

 \therefore Least value of n is '7'.**15. Correct answer is [16].** n people get average ₹ 352

$$\therefore \text{Total amount} = 352n$$

Now, 2 people get a total of 506 + 506 = 1012

$$\therefore \text{Remaining amount} = 352n - 1012$$

 \therefore A.T.Q.,

$$\frac{352n - 1012}{n - 2} \leq 330$$

$$\Rightarrow 22n \leq 352$$

$$\Rightarrow n \leq 16$$

 \therefore maximum value of $n = 16$.**16. Correct answer is [407].**Let the no. of white and blue shirts bought is x and y , respectively.

$$\text{Total cost price} = 1000x + 1125y$$

$$\text{Average cost price per shirt} = \frac{1000x + 1125y}{x + y}$$

& Average marked price per shirt

$$= \frac{1000x + 1125y}{x + y} \times 1.25$$

\therefore Average selling price per shirt

$$= \frac{1000x + 1125y}{x + y} \times 1.25 \times 0.9$$

Total selling price

$$= (1000x + 1125y) \times 1.25 \times 0.9$$

\therefore Profit = 51000

$$(1000x + 1125y) \times 1.25 \times 0.9 - (1000x + 1125y) = 51000$$

$$\therefore (1000x + 1125y) (1.25 \times 0.9 - 1) = 51000$$

$$(1000x + 1125y) \times 0.125 = 51000$$

$$\Rightarrow 8x + 9y = 3264 \quad \dots(1)$$

For highest possible value of x & y

$$x = 399$$

$$y = 8$$

$$\therefore x + y = 399 + 8 = 407$$

17. Option (1) is correct.

$$\frac{PQ}{QR} = \frac{a}{b}$$

$$\therefore PQ^2 + QR^2 = (2r)^2$$

$$PQ^2 + \left(\frac{a^2}{b^2}\right)PQ^2 = 4r^2$$

$$PQ^2 = \frac{4r^2b^2}{a^2 + b^2}$$

$$PQ = \frac{2rb}{\sqrt{a^2 + b^2}}$$

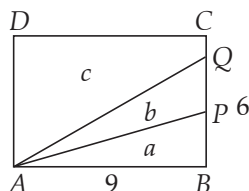
$$QR = \frac{2ra}{\sqrt{a^2 + b^2}}$$

$$\therefore \text{Area of } \triangle PQR = \frac{1}{2} \times PQ \times QR$$

$$= \frac{1}{2} \times \frac{2rb}{\sqrt{a^2 + b^2}} \times \frac{2ra}{\sqrt{a^2 + b^2}}$$

$$= \frac{2r^2ab}{a^2 + b^2}$$

18. Option (1) is correct.



Let Area of $\triangle ABP$, $\triangle APQ$ and $\square AQCD$ are a , b , c .

Then according to question

$$b^2 = ac \quad \dots(1)$$

and

$$c = 4a \quad \dots(2)$$

\therefore by (1) & (2),

$$b^2 = 4a^2 \Rightarrow \boxed{b = 2a}$$

Area of $\triangle ABP$: Area of $\triangle APQ$: Area of $\square AQCD$

$$\begin{array}{ccc} a & : & b & : & c \\ a & : & 2a & : & 4a \\ 1 & : & 2 & : & 4 \end{array}$$

$$\& a : b : c = \frac{1}{2} \times BP \times AB : \frac{1}{2} \times PQ \times AB$$

$$: \frac{1}{2} (CQ + AD) \times CD$$

$$a : b : c = BP \times AB : PQ \times AB : (CQ + AD) \times AB$$

$$1 : 2 : 4 = BP : PQ : CQ + 6$$

$$\begin{array}{l} \frac{BP}{PQ} = \frac{1}{2} \quad \left| \quad \frac{PQ}{CQ+6} = \frac{2}{4} = \frac{1}{2} \right. \\ BP = \frac{PQ}{2} \quad \left| \quad 2PQ = CQ + 6 \right. \\ \quad \quad \quad \quad \quad CQ = 2PQ - 6 \end{array}$$

$$\therefore BP + PQ + CQ = 6$$

$$\frac{PQ}{2} + PQ + 2PQ - 6 = 6$$

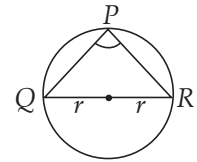
$$7PQ = 24$$

$$PQ = \frac{24}{7}$$

$$BP = \frac{12}{7}$$

$$CQ = 6 - \frac{36}{7} = \frac{6}{7}$$

$$\therefore BP : PQ : QC = \frac{12}{7} : \frac{24}{7} : \frac{6}{7} = 2 : 4 : 1$$



19. Correct answer is [45].

$$|x - y| - |x - 5| = 2$$

Area with y axis ($x = 0$) and $x = 5$

$$\Rightarrow 0 \leq x \leq 5$$

When

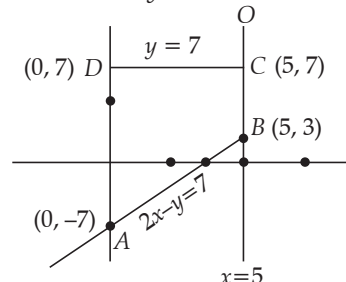
$$x < 5$$

$$|x - y| + x - 5 = 2$$

$$|x - y| = 7 - x$$

$$x - y = \pm(7 - x)$$

$$x - y = 7 - x$$



$$\begin{aligned}2x - y - 7 &= 0 \\x - y &= -7 + x \\y &= 7\end{aligned}$$

$$\begin{aligned}\therefore \text{Area} &\Rightarrow \frac{1}{2} \times (AD + BC) \times CD \\&= \frac{1}{2} \times (14 + 4) \times 5 \\&= 9 \times 5 \\&= 45\end{aligned}$$

20. Option (2) is correct.

$$\begin{aligned}p^2 + q^2 - 29 &= 2pq - 20 = 52 - 2pq \\p^2 - 2pq + q^2 &= 9 \quad 4pq = 72 \\(p - q)^2 &= 9 \quad pq = 18 \\p - q &= \pm 3 \\\therefore p &= 6 \\q &= 3 \\p &= -6 \\q &= -3 \\p^3 - q^3 &= 6^3 - 3^3 = 216 - 27 \\&\& \quad p^3 - q^3 = -216 + 27 \\&\text{differential } (216 - 27) - (-216 + 27) \\&= 432 - 54 \\&= 378\end{aligned}$$

21. Option (3) is correct.

Given: Two A.P.

$$a_1, a_2, a_3 \dots$$

$$b_1, b_2, b_3 \dots$$

Let d_1 & d_2 be common difference of two AP's.

$$\begin{aligned}a_5 &= b_9 \\a_1 + 4d_1 &= b_1 + 8d_2 \\a_1 - b_1 &= 8d_2 - 4d_1 \quad \dots(1)\end{aligned}$$

$$\begin{aligned}a_{19} &= b_{19} \\a_1 + 18d_1 &= b_1 + 18d_2 \\a_1 - b_1 &= 18d_2 - 18d_1 \quad \dots(2)\end{aligned}$$

$$\begin{aligned}\text{and } b_2 &= 0 \Rightarrow b_1 + d_2 = 0 \quad \dots(3) \\&\text{by (1) \& (2)}\end{aligned}$$

$$\begin{aligned}8d_2 - 4d_1 &= 18d_2 - 18d_1 \\14d_1 &= 10d_2 \Rightarrow \frac{d_1}{d_2} = \frac{5}{7} \quad \dots(4)\end{aligned}$$

$\therefore d_1$ & d_2 are prime numbers

$$\therefore d_1 = 5, d_2 = 7$$

$$\therefore \text{by (3)} \quad b_1 = -7$$

$$\text{and } b_9 = b_2 + 7d_2 = 0 + 49 = 49$$

$$\therefore a_{11} = a_5 + 6d_1 = 49 + 30 = 79$$

22. Correct answer is [967].

$$a_n = 13 + 6(n - 1)$$

$$a_n = 13 + 6n - 6$$

$$a_n = 6n + 7$$

$$b_n = 15 + 7(n - 1)$$

$$b_n = 15 + 7n - 7$$

$$b_n = 7n + 8$$

Series are

$$13, 19, 25, 31, 37, 43$$

and

$$15, 23, 31, 39, 43 \dots$$

difference of common AP's is

$$= \text{LCM}(6, 7) = 42$$

\therefore AP of common terms,

$$\Rightarrow 43, 85, 127, 169 \dots$$

$$\begin{aligned}\therefore n^{\text{th}} \text{ term of series} &= 43 + 42(n - 1) \\&= 42n + 1\end{aligned}$$

$$\therefore 42n + 1 < 1000$$

$$\Rightarrow n < \frac{999}{42}$$

$$\Rightarrow n < 23.78$$

\therefore Highest possible value of $n = 23$.

\therefore Highest 3 digit term common to both the original series

$$= 42 \times 23 + 1 = 967$$